

ABSTRACT OF THE DISCLOSURE

A semiconductor integrated circuit device having a switching MISFET, and a capacitor element formed over the semiconductor substrate, such as a DRAM, is disclosed. In a first aspect of the present invention, the impurity concentration of the semiconductor region of the switching MISFET to which the capacitor element is connected is less than the impurity concentration of semiconductor regions of MISFETs of peripheral circuitry. In a second aspect, the Y-select signal line overlaps the lower electrode layer of the capacitor element. In a third aspect, a potential barrier layer, provided at least under the semiconductor region of the switching MISFET to which the capacitor element is connected, is formed by diffusion of an impurity for a channel stopper region. In a fourth aspect, the dielectric film of the capacitor element is co-extensive with the capacitor electrode layer over it. In a fifth aspect, the capacitor dielectric film is a silicon nitride film having a silicon oxide layer thereon, the silicon oxide layer being formed by oxidizing a surface layer of the silicon nitride under high pressure. In sixth and seventh aspects, wiring is provided. In the sixth aspect, an aluminum wiring layer and a protective (and/or barrier) layer are formed by sputtering in the same vacuum sputtering chamber without breaking the vacuum between forming the layers; in the seventh aspect, a refractory metal, or a refractory metal silicide QSi_x , where Q is a refractory metal and

$0 < x < 2$, is used as a protective layer, for an aluminum wiring containing an added element (e.g., Cu) to prevent migration.

III. $\frac{1}{2} \leq x < 1$, is used as a protective layer, for an aluminum wiring containing an added element (e.g., Cu) to prevent migration.